Property Values

Findings:

1. The key concerns with regard to property values are:

a. Increased towers can lead to less interest in long term ownership-rental properties are more likely.

b. Residents expect the value of their property won't be decreased once they have purchased property.

2. The effects of towers on nearby property values are:

a. Towers adversely affect property values but the exact amount is hard to determine due to different methods used by property appraisers and the uniqueness of each property.

b. Lookout Mountain property value trends cannot be compared to another area due to its unique views.

3. The specific characteristics of telecommunication facilities that seem to negatively impact property values are:

a. Visual Impact

b. Interference

c. Concern over possible health effects

Tower Siting & Review

Policies:

1. All telecommunications facilities:

a. Towers and other structures should be located in the area of least visual impact within the site which will allow the facility to function consistent with its purpose.

b. The applicant must show that their proposed equipment cannot be accommodated and function as required by its construction permit or license without unreasonable modifications on any other existing facility.

c. Dishes and accessory buildings should be located to minimize their visual impact while functioning consistent with their purpose.

d. Applicants should make reasonable efforts to obtain waivers to FAA coloring and lighting requirements.

e. The ODP should specify a timeframe within which all buildings or towers to be abandoned or consolidated will be removed.

f. The applicant should show that adequate fire protection is available.

g. All other recommendations concerning interference, health and design of accessory structures should be followed.

2. Broadcast facilities proposed within major use transmission areas should meet the following guidelines:

a. The new tower should be stressed to accommodate multiple users. If the new tower is to be used for major broadcasters (TV or FM), it should be stressed for a multiplexed FM antenna and/or two multiplexed TV antenna or the equivalent.

b. New towers on Lookout Mountain should be located on the eastern slope (based on a North-South axis) of Lookout Mountain unless it can be demonstrated that a proposed tower in another location would have less visual impact and still function consistent with its purpose.

c.1) New towers should be permitted only when an equal face area (one face width x height) of existing tower(s) can be removed or as credited in c.2), c.3), or c4) below. If a new tower is proposed in a major use transmission area, the tower(s) to be removed must come from that area.

c.2) Buildings or other structures that have an adverse visual impact and that are located within the vicinity of a proposed tower may be considered for removal credit for new towers proposed at less than 200 feet high, or for a portion (not to exceed 200 vertical feet) of a taller tower.

c.3) Some tower face area credit should be allowed for new facilities that will provide space for at least 2 different TV or FM stations which are not the same channel and are not redundant or back-up systems.

c.4) Some tower face area credit should be allowed for 2-way or land mobile towers where a minimum of 25% of the tower's designed capacity will be made available for future use.

d. Multiplexing and other methods should be used whenever possible and practical to maximize the capacity of towers.

3. Facilities proposed outside major use transmission areas:

a. It should be demonstrated that there is not suitable space on existing towers at other telecommunications sites or on other sufficiently tall structures like buildings or water towers where the intended telecommunications use can be accommodated and function as required by its construction permit or license without unreasonable modifications.

b. If suitable space does not exist as described above, one of the following options should be used:

1) Build a facility capable of serving multiple users; or

2) Locate a tower in close proximity to other towers; or

3) Locate a new tower in areas where the tower and accessory building can be at least 80% screened by existing vegetation, land forms, or structures.

c. New structures should accommodate other users such as two-way radio, consistent with the site's development potential. Sites must be reviewed on a case-by-case basis to determine the extent of shared use that could be accommodated without creating objectionable impacts.

Low Power Mobile Radio Service Addendum

Introduction

The use of low power mobile radio service has increased at an astonishing rate since its introduction in the mid 1980's. An ever-increasing number of users are taking advantage of the advancement of telecommunication technology to meet their communication needs. The market for low power mobile radio service telecommunication has grown from only a few well-to-do individuals to a wide variety of users. Businesses, public safety departments, and recreational users are finding new ways to utilize the advancing technologies. Some forecasters predict as many as 100 million customers for low power mobile radio service within the next ten-years.[1]

Recent regulatory changes by the Federal Communication Commission (FCC) have opened up new portions of the radio spectrum to allow new wireless competition into the market. Now, in addition to cellular, low power low power mobile radio service communication have expanded to include Enhanced Specialized Low Power Mobile Radio (ESMR) and Personal Communication Services (PSC). These new low power mobile radio services will have physically similar facilities to the better known cellular facilities.

The current Jefferson County Telecommunications Plan was adopted in 1985 when the industry was making its debut and has since been updated in 1992. It was intended to focus on major broadcasting facilities in centralized areas within the County and does not adequately address low power mobile radio service technology. The purpose of this document is to develop an addendum to the *Telecommunications Land Use Plan* to address the land use issues brought on by the rapid growth in demand for low power mobile radio service.

Low power mobile radio service technology differs from the more traditional broadcasting technology. Traditionally most broadcasters transmit their signal from tall towers from low to high power in an attempt to reach as many people as possible in a large geographic area. In contrast, low power mobile radio service networks typically use low facilities at lower power to reach a limited number of users in a small geographic area. For several of the low power mobile radio technologies, each site is called a "cell site". The sites may be interconnected to other sites which in turn create a low power mobile radio service network. Because of these fundamental differences, low power mobile radio service facilities should not be viewed by the plan in the same way as other telecommunication facilities, but should be a separate section of the Jefferson County Telecommunications Land Use Plan.

Until the adoption of this Plan, there is no differentiation in review procedures for various types of telecommunication facilities. All are classified together as "radio, television and microwave transmission and relay towers" and dealt with similarly in the zoning regulations. A 500-foot broadcast tower, for example, was evaluated in the same manner as building-mounted panel antennas. A more refined review and evaluation procedure, based on rational siting criteria and appropriate impact mitigation, was streamlined the approval process and brought greater efficiency to benefit the public, the industry and the County. Low power mobile radio service technology and system design parameters place unique constraints upon facility placement that until recently, were not recognized in the County's regulatory framework.

This Plan distinguishes low power mobile radio service communication from other broadcasting type telecommunication technologies and establishes policies that deal with issues of demand, visual mitigation, noise, engineering, residential impacts, health, and facility siting. This Plan supersedes all the references to low power mobile radio service technology found in the current Telecommunications Plan, but it is not the intent of this Plan to override existing Community Plan's policies and recommendations.

Concurrently with the adoption, corresponding changes should be made to the Jefferson County Zoning Resolution to institute the policies and recommendations of this Plan.

Background

Low Power Mobile Radio Service Technology

Low power mobile radio Service communication works this way: A mobile or hand-held portable hand sets transmits a signal from a caller to a site antenna. The call is then relayed from the site antenna via a land based telephone line or microwave dish to a centrally located switch computer. The switch computer completes the call by tying into the Public Switched Telephone Network [PSTN (land line)] to a land line telephone or sending it back to a site to be transmitted to another low power mobile radio service handset. As a low power mobile radio service user passes through different sites, the call is switched from site to site by the switch. This process is known as hand-off. In this fashion, the caller can continue the call uninterrupted.

[1] *USA Today, 7/26/94, page 1B*

For the most part, low power mobile radio service employs a cellular-like technology. This initial network provides coverage for a FCC licensed service area. The size of the site's coverage area may vary depending on engineering and geographic constraints. Generally, sites with high antennas cover large geographic areas where demand for service is low. These site facilities are called coverage sites. In areas where demand for service is high, the site will cover a small geographic area and use lower facilities. These sites are called capacity sites. Each site has a maximum number of telephone calls that can be handled at one time. When this number is reached, the site has reached its capacity. A site at capacity must be split to cover smaller geographic areas, to cover the same area as the original site. The same number of radio channels are reused throughout the system. Since channels must be reused in the network, it is important that each site have a height and power level that does not interfere with other sites in the operating system.

To maintain maximum efficiency, low power mobile radio service sites are engineered to maintain a line of sight between the user and the low power mobile radio service antenna. To ensure the signal is transmitted unobstructed, it is necessary to elevate the antenna of the site above any topographic feature and/or tree tops found within the site's assigned geographic area.

As the low power mobile radio service industry evolves, technological changes can be expected that will impact the growth of low power mobile radio service users and the ultimate design of low power mobile radio service facilities. One such technological advance on the horizon for implementation in the near term that will help the low power mobile radio service providers meet the need for additional capacity sites is the shift from analog to digital signal processing. The industry is debating over digital technology standards - Time Division Multiple Access (TDMA), currently used by cellular and ESMR; and Code Division Multiple Access (CDMA), available in the future. These technologies promise to boost low power mobile radio service capacity by a factor of three to six, once the system is fully converted and without major additions to the existing physical systems. These and other changes in low power mobile radio service technology may require physical alteration of antenna systems on low power mobile radio service facilities.

In addition to the advances that will increase capacity without major additions to the existing physical systems, there also are changes expected in the sizes of and applications for low power mobile radio service equipment. Cellular ESMR and PCS will provide services in addition to voice transmission. They will offer data transmission, paging system, message service and fleet service capabilities. Low power mobile radio service transmitters and receivers are expected to be smaller in the future, requiring less space for the "equipment building" function of the site. "Micro-cells," linked in parallel by fiber optic cable or other means of transmitting voice and/or data from the main site will offer future designers application opportunities that do not currently exist. Although the number of sites may increase significantly in the future using the new, smaller equipment that the industry anticipates, their physical characteristics should be very different than what exists today.

Low Power Private Mobile Radio Service Technology (PMRS)

Low power private mobile radio services are separated from Commercial Mobile Radio Systems (CMRS) by the FCC primarily because this mobile radio service is for private use and not connected to the public telephone network. This type of radio service is a not-for-profit service in and of itself but it may be part of a business operation which may be for profit such as a two-way radio service used by businesses that operate a fleet of vehicles or emergency response providers. In general, PMRS utilizes a single site which may cover a larger geographic area than commercial network facilities.

Types of Facilities

There are three categories of low power mobile radio service facilities that incorporate some or all of the typical components listed below. Roof and/or Building Mounted Facilities occur when low power mobile radio service antennas are attached to or mounted on an existing structure, such as a water tank or building. Freestanding Facilities use some type of stand-alone structure for antenna support, such as a wooden pole, steel monopole, lattice tower, or light standards. Micro-cell or Repeater Facilities are used to extend low power mobile radio service coverage or capacity to dead spots or high traffic areas. These facilities are linked to a "donor" site by a donor antenna, microwave, fiber optic, or phone line connection. Required equipment is much smaller than for the other two facility types.

Depending upon its type, a low power mobile radio service telecommunications facility may include all or some of the following elements:

1. Equipment Storage

A small unmanned, single story equipment building less than 500 square feet gross floor area (GFA) in size used to house radio transmitters and related equipment. This equipment may also be placed inside an existing structure when appropriate space is available. Micro-cells do not require any accessory building.

2. Antennas

a. Omnidirectional antennas, also known as whip antennas, are used when 360 degree coverage is desired.

b. Directional antennas, such as panel antennas, are used to transmit and receive signals for situations when directional coverage is desired. Panel antennas are typically rectangular in shape.

c. Microwave antennas are used to link two technologically compatible telecommunication facilities together by line of sight. They are typically circular or parabolic in shape and can be a grid or solid materials.

3. Antenna Mounting

Structures on which antennas can be mounted include:

a. A roof, building side, or other structure such as a silo, windmill, water tank, smokestack, or existing communication tower.

b. Monopoles made of wood or metal are used for lower heights of 30 to 150 feet and when structural loads are relatively light.

c. Lattice towers (steel structures) which have 3 or 4 sides. They can be guyed or self supporting. Greater heights and larger structure loads can be accommodated using these towers.

d. A cross bar or platform is often used to provide horizontal separation of antennas on the mounting structure.

4. Fencing

The freestanding pole, tower, and/or building is usually fenced with security fencing.

Health Issues

The level of radio frequency (RF) radiation emitted from low power mobile radio service relay transmissions have been determined to be far below the level now known to cause negative health effects. The levels have been determined to be only a small fraction of the radiation the public is exposed to on a daily basis.

The Federal Communications Commission (FCC) has adopted the American National Standards Institute (ANSI) standards for RF emissions, which are recognized by Jefferson County as being acceptable In the immediate vicinity (within 50 feet) of a low power mobile radio service transmission tower, the power density has been determined to be no more than 1/150 of the ANSI exposure standards. This level is well below the most restrictive exposure standards in effect across the country, which are one-fifth of the ANSI Standards. As the distance from the antenna increases, the power level decreases by an inverse squared factor. Microwave relay antennas utilize very low levels of power. The power density emitted is typically no greater than 1/500,000 of the ANSI exposure standard, at the tower base. Therefore, based on the above, there are no expected negative health effects from exposure to a low power mobile radio service telecommunications facility.

Community Response

Despite enthusiastic response of Jefferson County citizens to low power mobile radio service, strong objections have been raised to the presence of low power mobile radio service facilities in communities and neighborhoods. These objections are based on the visual effect of these facilities and the presence of this type of activity in residential areas. This has been the case not only in zoned residential districts, but also in areas which are zoned as agricultural, but which are actually used as residential property. This document recognizes that certain types of low power mobile radio service telecommunications facilities are inappropriate in areas of single-family residential development.

1. Electromagnetic Interference

Because of the frequencies assigned to the low power mobile radio service providers by the FCC and the relatively low power output by low power mobile radio service facilities, possible interference to household appliances such as radios, television and cordless telephones for nearby residents will be minimal. The FCC has established regulations governing interference that state it is the responsibility of the carrier to promptly resolve any electromagnetic interference problems created.

2. Residential Property Values

Low power mobile radio service facilities should be located and designed to minimize any adverse effect they may have on residential property values. Strict compliance to the policies and recommendations of this Plan and adherence to the design standards and careful location of facilities should minimize any adverse effects on property values.

Federal, State, & Local Regulations

1. Federal Communications Commission

In August of 1993, when Congress enacted the Omnibus Budget Reconciliation Act of 1993, the public mobile and private radio categories were replaced with two newly defined categories - Commercial Low Power Mobile Radio Service (CMRS) and Private Mobile Radio Service (PMRS). CMRS includes all services that are for: a) profit, b) interconnected to Public Telephone Switched Network, and c) available to the public or such classes of eligible users as to be effectively available to a substantial portion of the public. At this time, this definition would include: Cellular, ESMR and Paging Services, and Personal Communications Services/ Person Communications Networks. All other forms of wireless telecommunications which are not CMRS are considered Private Low Power Mobile Radio Service (PMRS). PMRS include industrial, land transportation, special emergency, public safety and government, automatic vehicle monitoring, personal mobile (CB's), and HAM operators.

The FCC has authorized a very limited frequency band for both CMRS and PMRS.

2. Federal Aviation Administration (FAA)

Under authority granted in the Federal Aviation Act, the FAA reviews the location and height of proposed towers to prevent possible interference with nearby airport operations. The agency has jurisdiction over towers that exceed 200 feet in height, as well as smaller towers located within 20,000 feet of a major airport (commercial and military aircraft facility) and 10,000 feet of a general aviation airport (serving smaller aircraft). The FAA requires that such towers be painted and/or appropriately illuminated. The FAA also has authority to review possible interference problems with aircraft-to-ground communications caused by transmission facilities in or near flight paths. It is the responsibility of the carrier to file a notice of proposed construction when necessary and receive painting and/or lighting instructions from the FAA.

3. State and Local Regulation

Low power mobile radio service telecommunication is considered a non-regulated public service that the Colorado Public Utilities Commission has chosen not to regulate at this time. From the standpoint of local land use regulations, low power mobile radio service telecommunication companies are considered private enterprises subject to applicable local zoning controls, to the extent not otherwise preempted by state and federal laws.

c. Lattice towers (steel structures) which have 3 or 4 sides. They can be guyed or self supporting. Greater heights and larger structure loads can be accommodated using these towers.

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Future Demand

The low power mobile radio service industry has experienced rapid growth since its inception, and it is expected future technologies offered to the public will also be popular. Growth of this industry is being fueled by a number of factors such as lower cost of telephones and services, expanding areas of coverage, new advances in low power mobile radio service technologies, expanded services, and a wide variety of new users. In unincorporated Jefferson County, the number of sites will grow steadily. This trend is expected to level off once each provider has established their network and converted to the digital base technology.

Based upon the projected demand for low power mobile radio service and the engineering constraints of the network, the following are likely places for sites:

1. Population Centers

Most population centers within the unincorporated areas of the County currently have some level of low power mobile radio service. These areas are likely to require new sites as new industries are licensed by the FCC. Demand will increase and site capacity will reach its limit and must be split to increase capacity for current and future technologies.

2. Transportation Corridors

New sites are also likely along major transportation corridors within the County.

3. Areas of Variable Topography

Topography places constraints on the "ideal" line-of-sight signal path for low power mobile radio service transmissions. Additional sites may be needed in some locations to fill in the shadowing caused by topographic changes.

Predicting the growth of low power mobile radio service telecommunications, and, more specifically, the number of new sites that will be required in any future time-frame by low power mobile radio service providers, is virtually impossible. Demand for low power mobile radio service relates to many factors including customer usage and economic conditions, by market sector and geographic sub-area. Increasing use of portable low power mobile radio service phones has impacted coverage requirements. Low power mobile radio service is increasingly being used for non-voice transmission, including data such as mobile fax and telemetry, Global Positioning System/Geographic Information System and Emergency Services interconnect.

Site Selection

Industry Site Selection Criteria

In siting a new site, the industry requires a location that is technically compatible with the established network. A general area is identified based upon engineering constraints and the desired area of service. Specific locations within that general area are evaluated using the following criteria (not listed in any order of priority):

1. Topography as it relates to line of sight transmission for optimum efficiency in telephone service.
2. Availability of road access.
3. Availability of electric power.
4. Availability of land based telephone lines or microwave link capability.
5. Leasable lands and willing landlords.
6. Screening potential of existing vegetation, structures and topographic features.
7. Zoning that will allow low power mobile radio service facilities.
8. Compatibility with adjacent land uses.
9. The least number of sites to cover the desired area.
10. The greatest amount of coverage, consistent with physical requirements.
11. Opportunities to mitigate possible visual impact.
12. Availability of suitable existing structures for antenna mounting.

Citizens' Site Selection Criteria

Citizens believe that the following criteria should be addressed by the site selection process (not listed in any order of priority):

1. Certain types of low power mobile radio service facilities should not be located in single-family residential areas.
2. Preservation of view corridors.
3. Potential for preservation of pre-existing character of site.
4. Minimal impact on residential areas surrounding commercial or industrial zoned sites.
5. Selection of sites which lend themselves to visual mitigation.
6. Compatibility with surrounding land uses.
7. Pre-existing zoning that allows low power mobile radio service facilities.
8. Use of existing buildings.

General Policies for Site Selection

Site selection should be made in compliance with the Low power mobile radio Service Telecommunication Facilities Zone District Use Standards, which are set forth in the chart that appears within this section. Community and neighborhood visual concerns should be considered paramount in the consideration of and selection of sites. These concerns should be evaluated by a consideration of all the policies set forth in this Plan and in relevant Community Plans.

Site Selection Policies

The accompanying Zone District Use Standards Chart contains regulations which consider the following policies applicable to low power mobile radio service telecommunications facilities.

A. Within any zone district, sites should be located in the following order of preference:

1. On existing structures such as buildings, communication towers, water towers, and smokestacks.

2. In locations where the existing topography, vegetation, buildings, or other structures provide the greatest amount of screening.

3. Sites should be located on bare ground without visual mitigation only in certain commercial and industrial zone districts, based on defined parameters (see the visual mitigation policies in the following section).

B. Certain types of low power mobile radio service facilities are more appropriate in some zone districts than others and certain facilities create a greater impact on the surrounding area than others. The Zone District Use Standards contained in the chart on the following pages provide the basis for modifications to the Zoning Resolution which have been adopted along with this Plan concerning suitability of zone districts to accommodate the various types of low power mobile radio service facilities. In addition to the chart, the Plan has established a set of uniform standards for visual mitigation applicable to the various types of facilities and zone districts. These policies balance low power mobile radio service industry and homeowner concerns and are based on the specific impacts of the different types of low power mobile radio service facilities in relation to the character of land uses found in the County's zone districts. For example, the policies recognize that freestanding low power mobile radio service facilities generate the greatest impacts and, therefore, are most suitable in commercial and industrial zone districts.

Low Power Mobile Radio Service Telecommunication Facilities: Recommended Zone District Use Standards.

	Facility Type		
Zone District	Roof and/or Building Mount	Freestanding Facility	Micro-Cell or Repeater
SF Residential	NP	NP	NP
R-3 (Multifamily)	P	NP	SU
R-3A (Multifamily)	P	NP	SU
R-4 (Multifamily)	P	NP	P
C-1 (Convenience)	P	NP	P
C-1 (Neighborhood)	P	NP	P
C-1 (Community)	P	P	P
C-1 (Regional)	P	P	P
C-2	P	P	P
RC-1	P	P	P
I-1	P	P	P
I-2	P	P	P
I-3	P	P	P
I-4	P	P	P
PD	NP	NP	P
C-O	NP	NP	NP
A-1	SU	SU	SU
A-2	SU	SU	SU

P=Permitted (Use by Right)
NP=Not Permitted
**This plan recommends rezoning to Planned Development when seeking to locate a facility in NP zones*
SU=Special Use

C. Facilities should be located to minimize any adverse effect they may have on residential property values.

D. Facilities should be located to avoid a dominant silhouette on ridge lines, and preservation of view corridors of surrounding residential developments should be considered in the location and design of low power mobile radio service facilities.

E. Location of sites in commercial or industrial zones should consider the impact of the site on the surrounding neighborhood, particularly any adjacent residential neighborhood.

F. Facility must be architecturally and visually (color, bulk, size) compatible with surrounding existing buildings, structures, vegetation, and/or uses in the area or those likely to exist under the terms of the PD or underlying zone district. Micro-cell or repeater facilities may be considered architecturally or visually compatible if they are mounted on existing structures such as light standards, telephone poles, or otherwise camouflaged to disguise their low power mobile radio service use.

G. Less obtrusive facilities are preferred, and sites in industrial and commercial areas are preferred.

H. Co-Location: Where the result is less visual impact and the engineering of the low power mobile radio service network permits it, sites should be co-located with other low power mobile radio service facilities as well as other existing telecommunication sites and public structures. In co-location, anti-trust laws are a consideration.

I. Network Compatibility: At the time of site selection, the applicant should demonstrate how the proposed site fits into the overall network of the low power mobile radio service system within the County.

J. This plan recommends rezoning to Planned Development when seeking to locate a facility in a standard zone district which does not permit a commercial mobile radio facility.

Visual Impact & Screening Policies

The unique and diverse landscapes of Jefferson County are among its most valuable assets. Protecting these valuable assets will require that location and design of low power mobile radio service telecommunication facilities be sensitive to the setting in which they are placed. This is especially true in the mountainous parts of Jefferson County, where homes may be oriented to capture significant views and where site distance is greater. Visual concerns should include both those found on and off site. The following policies have been incorporated into the modifications to the Zoning Resolution establishing the visual impact and screening criteria of Jefferson County applicable to low power mobile radio service telecommunication facilities.

The following visual policies applicable to low power mobile radio service telecommunication facilities:

1. Low power mobile radio service facilities should be located and designed to minimize any adverse effect they may have on residential property values.

a. The use of compatible colors and facility designs should be compatible with surrounding buildings and/or uses in the area or those likely to exist in the area and should prevent the facility from dominating the surrounding area.

b. Location and design of sites in commercial or industrial zones should consider the impact of the site on the surrounding neighborhood, particularly the visual impact within the zone district.

c. Fencing should not necessarily be used to screen a site, and security fencing should be colored or should be of a design which blends into the character of the existing environment.

d. Freestanding facilities should be located to avoid a dominant silhouette on top of ridges.

2. Certain components of a site create a greater impact than other components. For example, the cross bar or other antenna mounting device and accessory building which may typically be part of a freestanding low power mobile radio service facility or a micro-cell or repeater site, may create a greater impact in a rural or mountain environment. A horizontal plane in a vertical setting can be intrusive, so the cross bar or other horizontal mounting device should be placed below the tree line to adequately mitigate its visual effect. These components should be afforded maximum screening, using existing vegetation and/or topography to minimize visual impact on the surrounding community.

3. Facilities should be architecturally compatible with surrounding buildings and land uses in the zone district or otherwise integrated, through location and design, to blend in with the existing characteristics of the site to the extent practical.

4. Site location and development shall preserve the pre-existing character of the site as much as possible. Existing vegetation should be preserved or improved, and disturbance of the existing topography of the site should be minimized, unless such disturbance would result in less visual impact of the site on the surrounding area. The effectiveness of visual mitigation techniques should be evaluated, taking into consideration the site as built.

5. At the time of rezoning or special use request, an evaluation of the visual impact should be taken into consideration if vegetation is to be removed for wildfire mitigation.

6. Innovative design should be used whenever the screening potential of the site is low. For example, by using existing light standards and telephone poles as mounting structures, or by constructing screening structures which are compatible with surrounding architecture, the visual impact of a site may be mitigated.

7. Roof and/or Building Mount Facility

Antennas on the rooftop or above a structure shall be screened, constructed and/or colored to match the structure to which they are attached. Antennas mounted on the side of a building or structure shall be painted to match the color of the building or structure or the background against which they are most commonly seen. Microwave antennas exceeding 12 inches in diameter on a roof or building-mounted facility shall not exceed the height of the structure to which they are attached, unless fully enclosed.

If an accessory equipment shelter is present, it must blend with the surrounding building(s) in architectural character or color.

8. Minimum setbacks for microcells and repeaters are those required for any accessory building or structure within the applicable standard zone district.

9. Minimum Setbacks for Freestanding Monopole and/or Lattice Towers

Minimum setback when located within 250 feet of any property zoned for residential land use: the tower height or the minimum setback for any accessory building within the applicable standard zone district, whichever is greater.

Minimum setback when not located within 250 feet of any property zoned for residential land use: the standard setback for a building or structure within the applicable standard zone district.

The structure must be architecturally and visually (color, bulk, size) compatible with surrounding existing buildings, structures, vegetation, and/or uses in the area or those likely to exist under the terms of the underlying zoning. Such facilities will be considered architecturally and visually compatible if they are mounted on or given the form of a light/sign standard or otherwise camouflaged to disguise the facility.

Implementation Policies

A. Zoning Resolution Changes

To address the policies and recommendations contained in this Plan, changes have been made to the Jefferson County Zoning Resolution as follows:

1. It distinguishes the low power mobile radio service industry from the other telecommunication industries. This is because the low power mobile radio service industry is technologically unique, rapidly expanding in the market economy, and shares few planning and land use impacts with other traditional telecommunication providers.

2. It clearly defines low power mobile radio service telephone communications and the types of facilities used by the industry.

3. The contents of the Zone District Use Standards chart and Visual Impact and Screening policies included in this Plan have been incorporated into the Jefferson County Zoning Resolution for regulation of low power mobile radio service facilities.

4. Administrative review for some types of facilities, as set forth in the Zone District Use Standards chart, have been accepted.

5. Setback requirements have been reviewed and accepted for reasonableness and flexibility, especially when evaluating visual impacts concerning the location of low power mobile radio services facilities on a particular site.

B. Community Notification

Prior to and subsequent to site application submittal for those sites where the facility is not a permitted use, the applicant should offer to meet informally with community groups and interested individuals who reside within the immediate vicinity (including adjacent landowners and registered homeowner associations) to explain the site development concept proposed in the application. The purpose of these meetings is to solicit suggestions from these groups about the applicant's proposed site design and impact mitigation measures. The industry needs to make a concerted effort to incorporate the community suggestions for impact mitigation generated by these meetings and report on their efforts in the hearings on the site application. The industry should be prepared to discuss technical and visual aspects of alternative sites as applicable at these informal meetings.

C. Third Party Review

The low power mobile radio service industry uses various methodologies and analysis tools, including geographically based computer software, to determine the specific technical parameters of a low power mobile radio service facility, such as expected coverage area, antenna configuration, topographic constraints that affect signal paths, etc. In certain instances there may be a need for expert review by a third party of the technical data submitted by the low power mobile radio service provider. The Planning Commission and/or Board of County Commissioners may require such a technical review, to be paid for by the applicant for the low power mobile radio service facility. Selection of the third party expert may be by mutual agreement among the applicant and interested parties or at the discretion of the County, with a provision for the applicant and interested parties to comment on the proposed expert(s) and review qualifications.

The expert review is intended to be a site-specific review of technical aspects of the low power mobile radio service facility and not a subjective review of the site selection. Such a review should address the accuracy and completeness of the technical data, whether the analysis techniques and methodologies are legitimate, the validity of the conclusions and any specific technical issues outlined by the Planning Commission, staff, or interested parties. Based on the results of the third party review, the County may require changes to the application for the low power mobile radio service facility that comply with the recommendations of the expert.

The expert review of technical submission shall address the following:

a. the accuracy and completeness of submissions;

b. the applicability of analysis techniques and methodologies;

c. the validity of conclusions reached; and

d. any specific technical issues designated by the Planning Commission or the Board of County Commissioners.

Abandonment

Low power mobile radio service facilities which are not in use for six months for low power mobile radio service purposes shall be removed by the low power mobile radio service facility owner. This removal shall occur within 90 days of the end of such six month period. Upon removal, the site shall be revegetated to blend with the existing surrounding vegetation.

Glossary

AM (Amplitude Modulation): Method of varying the amplitude of a radio signal while maintaining frequency; used to transmit AM radio signals and TV picture signals.

Antenna: A transmitting and/or receiving device used in telecommunications that radiates or captures radio signals. A group of electrical conductors that transmit or receive radio waves.

Band: A defined range of radio frequencies dedicated to a certain purpose (i.e., the FM band).

Broadcasting: Transmitting radio and television programming to reach the general public; contrasts with transmissions designed for a limited number of receivers.

Cellular Telecommunications: A Commercial Low Power Mobile Radio Service licensed by the Federal Communications Commission (FCC) to two providers in a specific geographical area in which the radio frequency spectrum is divided into discrete channels which are assigned in groups to geographic cells within a service area and which are capable of being reused in different cells within the service area.

Common Carrier: An organization authorized to provide telecommunication services to a third party.

Cross Bar: A structure at or near the top of the low power mobile radio service telecommunications facility which provides support and horizontal separation for the antenna(s).

Directional Antenna: An antenna or array of antennas designed to concentrate a radio signal in a particular area.

Duplex Antenna: One capable of transmitting the signals of two stations from one antenna.

Effective Radiated Power (ERP): The product of the antenna power input and the numerically equal antenna power gain.

FAA (Federal Aviation Administration): The federal agency responsible for aircraft safety.

FCC (Federal Communications Commission): The federal agency which regulates telecommunications.

FM (Frequency Modulation): Method of impressing an audio signal on a VHF frequency by varying the frequency; use to transmit FM radio, two-way radio, and television audio signals.

Frequency: The number of cycles completed each second by a sound wave; measured in hertz (Hz).

Interference: Disturbances in reception caused by intruding signals or electrical current.

Land-Mobile Systems: Two-way radio service for mobile and stationary units in which each user is assigned a particular frequency.

Lattice Tower: A guyed or self-supporting three- or four-sided, open, steel frame structure used to support telecommunications equipment.

Low Power Commercial Mobile Radio Network: A system of low power commercial telecommunications facilities which allow wireless conversation to occur from site to site.

Low Power Commercial Mobile Radio Service: a) profit, b) interconnected to Public Switch Network, c) available to the public or such classes of eligible users as to be effectively available to a substantial portion of the public, and must propose to or has develop, multiple networked sites within the County.

Low Power Mobile Radio Service Telecommunications Facility: A facility which consists of equipment for the reception, switching, and transmission of low power mobile radio service communications. Such facility may be elevated (either building-mounted or ground-mounted) transmitting and receiving antennas, low power mobile radio service base station equipment, and interconnection equipment. The categories of facility types include: 1) roof and/or building mount facilities, 2) freestanding low power mobile radio service facilities, and 3) micro-cell or repeater facilities. For purposes of district height limitations, height of freestanding low power mobile radio service telecommunications facility shall be measured from the average elevation of the finished grade of the building or structure.

Roof and/or Building Mount Facility: A low power mobile radio service telecommunications facility in which antennas are mounted to an existing structure on the roof (including rooftop appurtenances) or building face. Roof or building-mounted facilities may include micro-cell and/or repeater facilities. Such facilities must be screened, constructed or colored to match the existing structure to which

they are attached. Roof and/or building-mounted facilities shall not exceed the following maximum criteria.

1. The facility may include up to a maximum of 4 whip antennas, which may extend a maximum of 15 feet above the highest portion of the structure to which they are attached, including any rooftop appurtenances.

2. The facility may extend a maximum of 6 feet above the highest portion of the structure to which it is attached, including any rooftop appurtenances.

3. A single accessory building may be constructed provided that the building does not exceed 500 square feet gross floor area (GLA); and

4. Antennas on the rooftop or above a structure shall be screened, constructed and/or colored to match the structure to which they are attached. Antennas mounted on the side of a building or structure shall be painted to match the color of the building or structure or the background against which they are most commonly seen. Microwave antennas exceeding 12 inches in diameter on a roof or building-mounted facility shall not exceed the height of the structure to which they are attached, unless fully enclosed. If an accessory equipment shelter is present, it must blend with the surrounding building(s) in architectural character and color.

Freestanding Low Power Mobile Radio Service Facility: A low power mobile radio service telecommunications facility that consists of a stand-alone support structure, antennas and associated equipment. The support structure may be a wooden pole, steal monopole, lattice tower, light standard, or other vertical support. Whip antennas on a freestanding low power mobile radio service facility may extend a maximum of 15 feet above the highest portion of the structure to which they are attached; panel antennas may extend a maximum of 6 feet above the highest portion of the structure to which they are attached.

Micro-cell: A low power mobile radio service telecommunications facility used to provide increased capacity in high call-demand areas or to improve coverage in areas of week coverage. Micro-cells communicate with the primary low power mobile radio service facility in a coverage area via fiber optic cable or microwave. Coverage area for a micro-cell is typically a one-mile radius or less. Micro-cells shall not exceed the following maximum characteristics:

1. Pole height: not to exceed the height limit of the underlying zone district as measured from the average elevation of the finished grade of the building or structure; height is measured to the top of antennas.

2. Number of whip or panel antennas: four.

3. Number of microwave antennas: one.

4. Size of antennas whip antennas: no greater than 3" diameter and up to 24 inches long for each such antenna; for panel antennas: no greater than one square foot of surface area for each such antenna; for microwave antennas: as allowed by the applicable zone district regulations.

5. Size of accessory building: no building permitted.

6. Setback requirements: That required for any accessory building or structure within the applicable zone district.

Low Power Telecommunications Facility: An unmanned facility consisting of equipment for the reception, switching and/or receiving of wireless telecommunications operating at 1,000 watts or less effective radiated power (ERP), including but not limited to the following:

1. Point-to-point microwave signals.

2. Signals through FM radio translators.

3. Signals through FM radio boosters under 10 watts effective radiated power (ERP).

4. Cellular, Enhanced Specialized Mobile Radio (ESMR) and Personal Communications Networks (PCN).

5. Private Low Power Mobile Radio Service (PMRS).

MHZ: Megahertz or 1,000,000 Hz.

Microwave: Electromagnetic radiation with frequencies higher than 1,000 MHZ; highly directional signal used to transmit radio frequencies from point to point at a relatively low power level.

Microwave Antenna: A dish-like antenna manufactured in many sizes and shapes used to link communication sites together by wireless transmission of voice or data.

Monopole: A structure composed of a single spire used to support telecommunications equipment.

Multiplex Antenna: One capable of transmitting the signals of several stations.

MW/cm²: Milliwatts per square centimeter; a measurement of the radio frequencies hitting a given area.

Nonionizing Electromagnetic: The lower portion of the electromagnetic spectrum;

Omnidirectional Antenna: An antenna that is equally effective in all directions, and whose size varies with the frequency and gain for which is it designed.

Private Low Power Mobile Radio Service: All other forms of wireless telecommunications which have similar physical facilities as Commercial Low power mobile radio Service, but do not meet the definition of commercial mobile radio service.

RF: Radio Frequencies

Radiation: Includes household electric current, radio, television, microwave communication, radar, and visible light. It is insufficient to ionize tissue (unlike ionizing radiation created by fission of atoms); causes thermal effects at high levels; may cause nonthermal effects.

Repeater, Equipment: Contains both a receiver and transmitter; used to relay radio signals over large distances or to provide signals in an area otherwise in shadow.

Repeater, Low Power Mobile Radio Service Telecommunications Facility: Extends coverage of a cell to areas not covered by the originating cell. Repeater facilities shall not exceed the following maximum characteristics:

1. Pole height: in all zones, not to exceed the underlying zone district height limit as measured from the average elevation of the finished grade of the building or structure; height is measured to the top of antennas.

2. Number of whip or panel antennas: four.

3. Number of microwave antennas: one.

4. Size of antennas for whip antennas: no greater than 3" diameter and 12 feet long; for panel antennas: four square feet of surface area for each such antenna; for microwave antennas: as allowed by applicable zone district regulations.

5. Size of accessory building: one accessory building up to 100 square feet gross floor area (GFA) in size.

6. Setback requirements: that are required for any accessory building or structure within the applicable zone district regulations.

Shadow: Area within which a radio signal is received poorly or not at all due to manmade or natural obstructions in line of sight from the transmitter.

Translator: Equipment containing both a receiver and transmitter; used to relay TV signals over large distances or to provide signals in an area otherwise in shadow.

Transmission Tower: The structure on which transmitting and/or receiving antennas are located. An AM radio tower is its own transmitting antenna.

Transmitter: Equipment that generates radio signals for transmission via antenna.

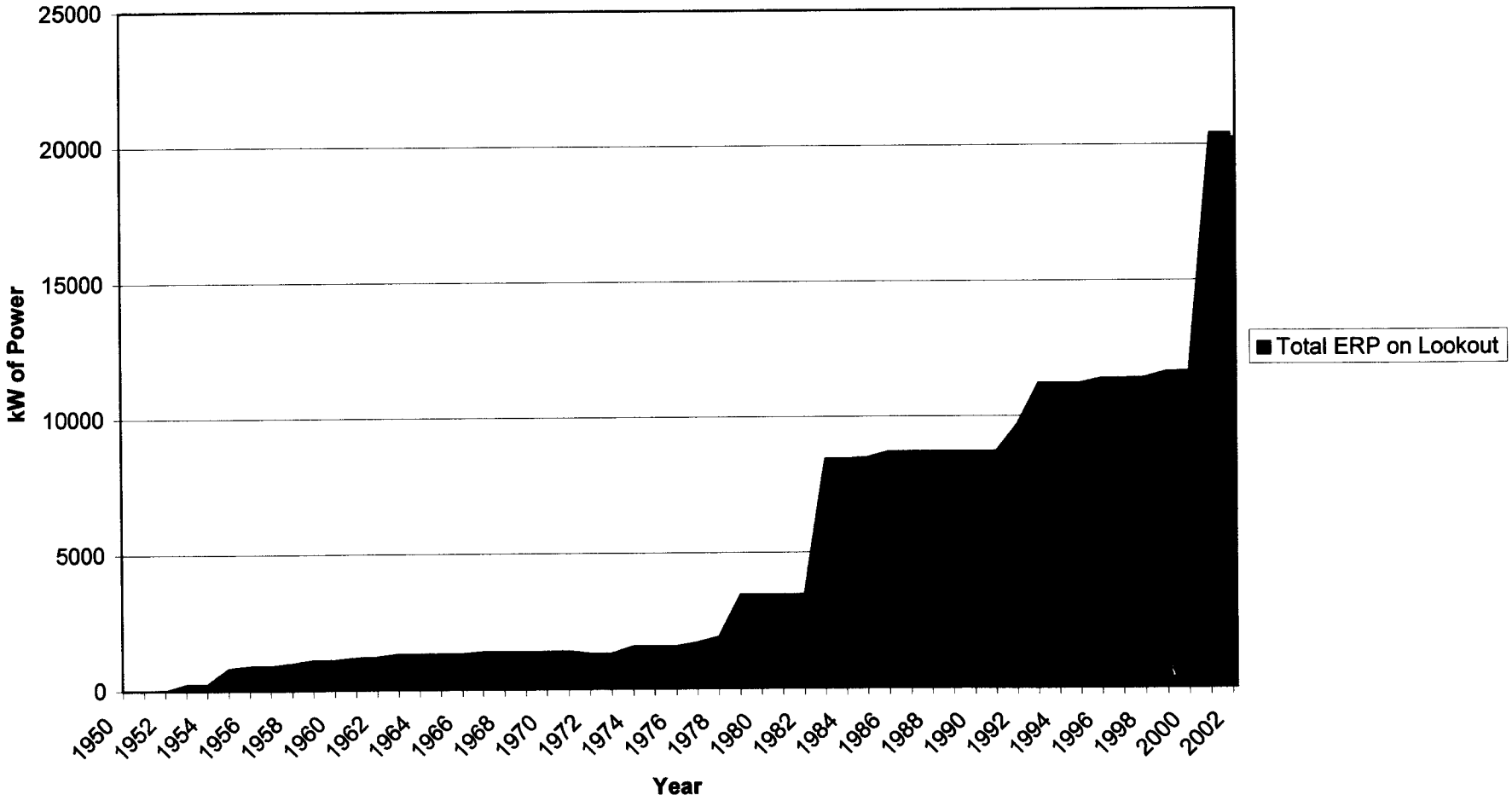
UHF: Ultra High Frequency with bands from 300 to 3,000 Mfz; includes UHF-TV (such as Channel 31), microwave, and some land mobile and common carriers.

uW/cm²: Microwatts per square centimeter; a measurement of the radio frequencies hitting a given area.

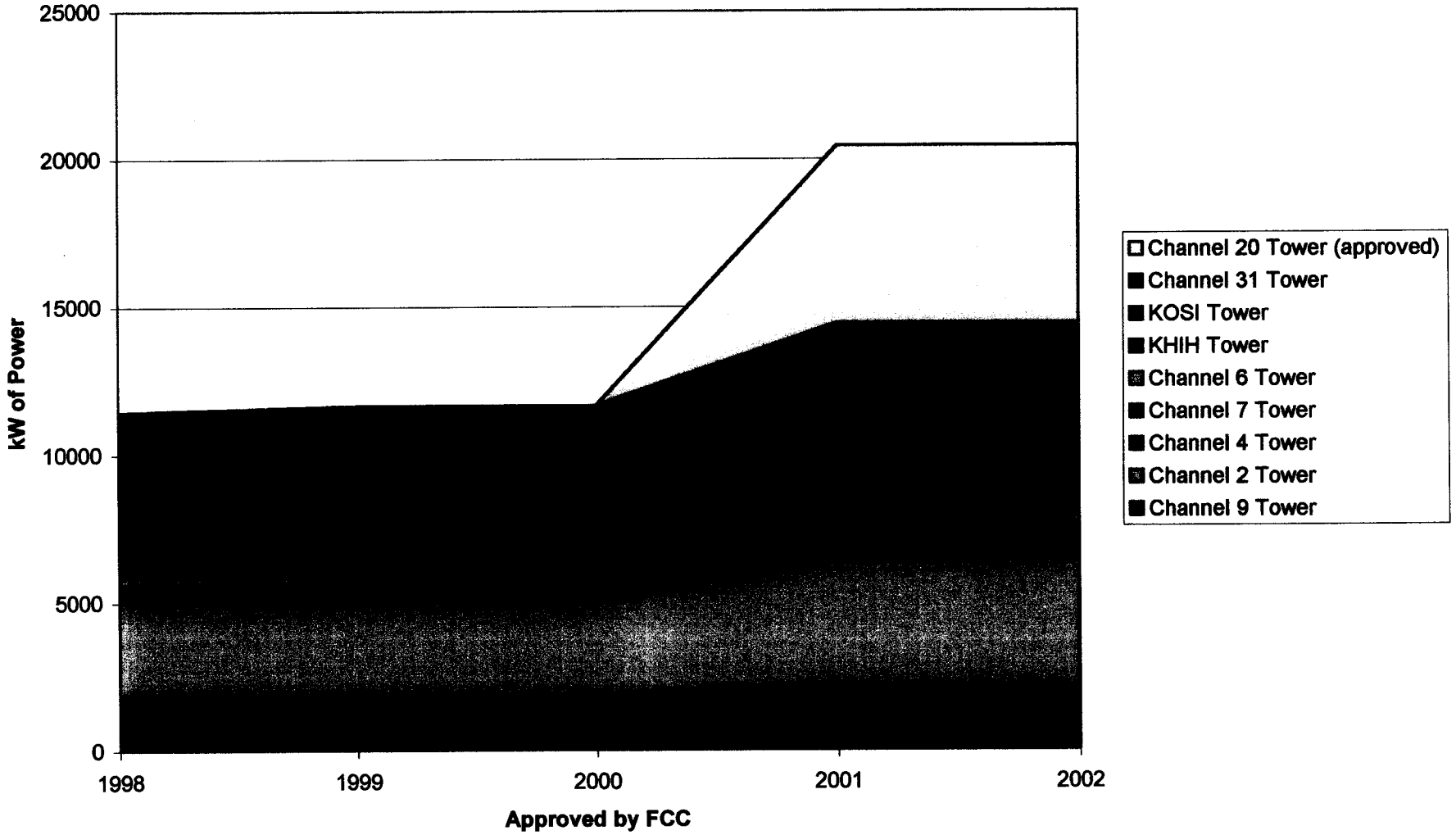
VHF: Very High Frequency with bands from 30 - 300 MHZ; includes FM radio, VHF-TV (Channels 2 to 13) and some land mobile and common carriers.

Whip Antenna: An antenna that is cylindrical in shape. Whip antennas can be directional or omnidirectional. Their size varies based upon the frequency and gain for which they are designed.

CURRENT FCC PERMITS
Over 20 million watts of Broadcast Radiation
Effective Radiated Power (ERP) on Lookout Mountain



Power Increases on Lookout Approved by FCC
(Supertower shown as future because not approved by Jeffco but already approved by FCC)



Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Canyon Area Residents for the Environment	)	
Request for Review of Action Taken Under	)	DA 00-764
Delegated Authority on a Petition for	)	
An environmental Impact Statement	)	

Volume III CARE EXHIBITS

JEFFERSON COUNTY ZONING HEARING TRANSCRIPT EXCERPTS
In order by page number with exhibits used by that witness attached

5938 Tim Carl Jefferson County Case Manger/Planner
5946

6062 Bryan Starling City Councilor for City of Golden
6066
Letter of Golden City Council to Jefferson County Board of County Commissioners
Golden City Council Resolution No. 975
6232

6024 Dr. Richard Hoffman Chief Medical Officer Colorado Department of Health
6030
Resume of Dr. Hoffman

6058 Dr. John Witwer Colorado State Representative
6060
Letter of Dr. Witwer dated 2/17/99

6060 Jon deStefano President Jefferson County Board of Education
6062

6077 Dr. Gary Olhoeft Professor of Geophysics at Colorado School of Mines
6081

6099 Dr. John Reif Professor and Chairman in Department of Environmental Health at Colorado State University
6108

6110 Bob Barrett Registered Professional Engineer/Certified Consulting Engineer
6124
Proposed Tower Violates Jefferson County Zoning Resolution

Witness Testimony

Tim Carl

fine right there so that's fine. Okay. Frank, would you like to maybe clarify exactly why we're here before we get into the..

HUTFLESS: Oh. I could. Sure. I would perhaps just remind everyone that the hearing this evening is for the purpose of considering a rezoning application to allow the installation of a broadcast facility. The purpose of this hearing tonight is not to rewrite the regulations of the County nor is it to attempt to rewrite the Federal regulations pertaining to this matter. This Board has no jurisdiction over rewriting Federal regulations. So I would hope we could keep that in mind as we move forward. Thank you, Madame Chairman.

HOLLOWAY: Alright. Thank you.

CARL: Good evening, Madame Chairman. What I have on the screen right now is an outline of how staff would like to provide presentation for this request. We have allocated about 30 minutes of time. Let me turn the microphone volume up on this. I'm going to try to speak as clearly and loud for everyone that's in the room tonight. Staff has about thirty minutes to provide testimony regarding this case. There's quite a bit of information that I want to try to get across to you. I want to talk about the proposal itself. The evaluation of the request involving both our Central Mountains Community Plan, the Telecommunications Land Use Plan and the Jefferson County Zoning Resolution, various RF measurements that were taken on Lookout Mountain related to this request both by the applicant as well as the community and the Federal Communication Commission, the recent State Health Department study which was completed and information was provided in February. Let me stop

without unreasonable modifications on any other existing facility. We're not satisfied yet that this has been fully demonstrated. We are aware that there are other locations that do exist that could potentially accommodate digital TV broadcasting. One of those sites include Squaw Mountain. Another site includes Mount Morrison and then the other site is Eldorado Mountain. Squaw Mountain operates in Clear Creek County and can accommodate broadcast facilities such as those proposed with this application. It's located at an elevation of I believe 10,800 feet making it the highest broadcast site in this region. We did want to check and find out what their zoning is. It's a planned development zone district they did in Clear County. We understand or it's our understanding that the tower would still need to be constructed and they would need to get the necessary permits to do that through Clear Creek to comply with their rezoning. Mount Morrison I'm sure you are aware is in the process of going through a special use amendment that has not yet been heard by the County Commissioners, so their existing special use could not accommodate what's being proposed. However their application that they're proposing with it's amendment could potentially accommodate some digital television. And then Eldorado Mountain which is to the north of us, Eldorado Mountain is a site that currently accommodates an FM station as well as two-way radio. We looked into that. Eldorado had some concerns about whether based on previous staff comments whether we felt that that could reasonably accommodate DTV what we looked at and reviewed with the County Attorney is that the application limited the size of the proposed tower to 180 feet and it's stated intent was to

Witness Testimony

Bryan Starling

HOLLOWAY: Jon, hold on just a second.

DESTEFANO: Oh, I'm sorry.

HOLLOWAY: Do you have any questions for Jon? Okay. Thank you.

DESTEFANO: Thank you, too.

CARNEY: We're looking for Bryan Starling, Golden City Council.

STARLING: Yes. I'm Bryan Starling. I reside at 900 12th Street in Golden Colorado. I'm also a city councilor for the City of Golden. In addition to that I'm also a medical researcher of about 25 years in medical implants and I've had some experiences that run pretty similar to some of the things that we're discussing this evening. So I'll discuss those outside of the city council domain. I'd like to read for you the resolution that the City Council had passed. It is Resolution Number 975. It's a resolution of the City of Golden, City Council, requesting additional impartial and expert evaluation of the proposed HDTV tower on Lookout Mountain. And it states, "Whereas the City of Golden is home to the Colorado School of Mines which is the oldest institution of higher education in the State of Colorado and whereas the Colorado School of Mines is world renowned for the quality of it's teaching and research and whereas the members of the Colorado School of Mines faculty have expressed to City Council their grave concerns over the potential negative technical impact of the proposed broadcast facilities on their research which brings over 20,000,000 dollars into the local economy and whereas the Golden area is the location of

more than a dozen high tech businesses that may also experience serious problems with the proposed tower and whereas many of those businesses may be forced to move out of the Golden area if the tower is constructed and whereas Colorado School of Mines faculty and Golden business owners have expressed to City Council that the tower opponents and the County have not adequately evaluated and addressed their concerns. Therefore be it resolved by the City Council of the City of Golden Colorado Section One, the Golden City Council respectively requests that the Jefferson County Board of County Commissioners not approve any new broadcast towers on Lookout Mountain until competent studies of all potential interference is completed. Section Two, those studies should be conducted by an independent entity and in a manner acceptable to the faculty of the Colorado School of Mines. Section Three, City Council further requests that the Commissioners give due consideration to the visual impacts the tower and associated buildings will have on the Golden community". That was adopted the 28th day of January 1999, signed Jan C. Schenk, Mayor. We, as fellow city council have a great concern for our residences and the businesses in our city. With regards to my background I've had experience in a heart pace maker company which we've done electrical stimulation evaluations of a variety of human tissues, not primarily in the area that we're discussing here today with the type of radiation but different types of electrical stimulation. We've also done a lot of studies with regards to materials and the impacts on those in the human body. I've done this as I've said for about 25 years. Some of the materials that we originally had used in implants in

this profession had shown to be in the minds of all the professionals and all the committees that were put together safe and efficacious. Over time some of those materials did fail and had different mechanisms of failure than those things that were anticipated when they first were admitted into the implant arena. Some of those things are discovered in various ways. The body is a very complex organism. The ways and manifestations of failure can be many. I heard with great interest some of the discussion with the cellular wall membrane types of issues and I concur with some of those conclusions. I'm currently a vice-president of a small biotechnology company that cultures mammalian cell tissues. These tissues are for reimplantation in the body and there are very subtle effects that are noticed by slight chemical differential, differences and certainly from some of the other work that I've done in the heart pace maker things you could anticipate that there could be other complications. This is again, you don't find these things until you start looking for the effects. We're in the discovery phase basically at this point. Standards are always an evolving thing. I've worked in regulatory standards, evolutions within several of these companies as well as the recommendations to the FDA. In those standards it's always even as has been stated by the Cedar Group, it's an evolving type of thing. And we need to be very careful in our consideration of these standards because they do evolve. I've seen the standards evolve for some of the materials in the work that I've done to where some of the materials are no longer accepted as standards in the implant business. Finally, I would like to state that we do need to consider the financial impact to these things within the County.

Some of those businesses where I had seen some of the failed devices had gross impacts. I mean they pass standards. They met the standards. There was a repercussion of several of those businesses in which some of them had closed as a result of failed devices. I think the impact the litigation impact to the County needs to be anticipated if those types of things were to occur. It's important for us to anticipate what we think might happen even if we do not know it will happen. Finally I would like to say that in a lot of these device types of things you always anticipate that the human body is the same from person to person. We know from a lot of the material studies that there are some people that have different sensitivities to materials that others have not. One in example is nickel. Nickel is a component in several of the implant devices. People are tested for that sensitivity now. Initially they were not. And that can have an impact. That's why I'm trying to tell you is there are subtleties in these things that need to be considered. Thank you very much.

HOLLOWAY: Bryan, I have a question. How long has this problem been going on in Golden with the businesses and the interference in the businesses?

STARLING: We do not know the exact length of time. We've had some of the businesses come and speak to us. Certainly they've noticed it over the past I think couple of years definitely. Some of them, it's very much like I was trying to say with the medical things, they did not know where the interference was coming from until recently. Certainly there are complications in that as was recently discovered with the School of Mines Sprint issue but as

they become more attuned to the issue they're seeing that there is some component of that that does contribute to their problems.

HOLLOWAY: So their major thrust of this problem has only been in the last couple of years?

STARLING: As far as I know. And I'm saying that because there...some of the...when they came to speak to us they talked of fine sensitivities in which their instrumentation is getting to finer and finer sensitivities. So just as you're seeing the evolution of these TV towers you're seeing the evolution of technologies at other levels too. Their HDTV this is new. You're seeing some other evolution of technologies in instrumentation too.

HOLLOWAY: Okay. My other question was about the Sprint too. So, okay. Thank you. Oh, anybody else? Gee. Answered my questions. Okay it is virtually 10:30. It's 10:29. We're going to end it because we've got we know we've got a lot more testimony coming. So we will continue this.

LAWRENCE: You're going to need a motion.

HOLLOWAY: Until May 27th. Could I please have a motion to continue?

LAWRENCE: Yes. I move that we continue where's the number? I move that we continue Case Number 98015154RZP1 until Thursday May 27th at 5:00 p.m.

SHEEHAN: I'll second.

CLERK: Commissioner Lawrence?

LAWRENCE: Yes.

CITY OF GOLDEN

June 16, 1999

Honorable Patricia Holloway, Chair
Honorable Michelle Lawrence
Honorable Rick Sheehan
Jefferson County Board of County Commissioners
100 Jefferson County Parkway
Golden, Colorado 80419

Dear Pat, Michelle, and Rick:

We admire and respect the careful way you have considered the difficult issue of permitting the new broadcast tower on Lookout Mountain. Your approach has been responsible and fair to all concerned. While we have not listened to the hours and hours of testimony that you have, we have heard enough at City Council and other meetings to conclude that the application by Lake Cedar Group should be denied.

Approval of the request will adversely affect home values, the success of many of our high-tech businesses, the attractiveness of our community, and the health of our citizens. Every member of this City Council believes very strongly that you should deny the request. We are enclosing another copy of our Resolution 975 which we sent you in January. We do not believe that Lake Cedar Group has made a compelling argument or been as diligent as they should have been in addressing legitimate concerns raised by our citizens and yours.

If this proposed tower were within the city limits of Golden, we would vote "No," and we urge you to do the same.

Sincerely,

GOLDEN CITY COUNCIL

Jan Schenck, Mayor

Webb Aldrich

Chuck Baroch

Carol Johnson

Bill McKee

Ed Ramstetter

Brian Starling

RESOLUTION NO. 975

A RESOLUTION OF THE CITY OF GOLDEN CITY COUNCIL REQUESTING ADDITIONAL IMPARTIAL AND EXPERT EVALUATION OF THE PROPOSED HDTV TOWER ON LOOKOUT MOUNTAIN

WHEREAS, the City of Golden is home to the Colorado School of Mines, which is the oldest institution of higher education in the State of Colorado; and

WHEREAS, the Colorado School of Mines is world renowned for the quality of its teaching and research; and

WHEREAS, the members of the Colorado School of Mines faculty have expressed to City Council (see attached memorandum) their grave concerns over the potential negative technical impact of the proposed broadcast facilities on their research which brings over twenty million dollars into the local economy; and

WHEREAS, the Golden area is the location of more than a dozen high tech businesses that may also experience serious problems with the proposed tower; and

WHEREAS, many of those businesses may be forced to move out of the Golden area if the tower is constructed; and

WHEREAS, Colorado School of Mines faculty and Golden business owners have expressed to City Council that the tower proponents and the County have not adequately evaluated and addressed their concerns.

THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF GOLDEN, COLORADO:

Section 1. The Golden City Council respectfully requests that the Jefferson County Board of County Commissioners not approve any new broadcast towers on Lookout Mountain until competent studies of all potential interference is completed.

Section 2. Those studies should be conducted by an independent entity and in a manner acceptable to the faculty at the Colorado School of Mines.

Section 3. City Council further requests that the Commissioners give due consideration to the visual impacts the tower and associated buildings will have on the Golden community.

Adopted the 28th day of January, 1999.

Jan C. Schenck
Mayor

ATTEST:

Susan M. Brooks, CMC/AAE
City Clerk

APPROVED AS TO FORM:

James A. Windholz
City Attorney

I, Susan M. Brooks, City Clerk of the City of Golden, Colorado, do hereby certify that the foregoing is a true copy of a certain Resolution adopted by the City Council of the City of Golden, Colorado at a regular meeting thereof held on the 28th day of January, A.D., 1999.

(SEAL)

ATTEST:

Susan M. Brooks, City Clerk of the City of Golden, Colorado

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CITY OF GOLDEN

June 16, 1999

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Honorable Michelle Lawrence
Honorable Rick Sheehan
Jefferson County Board of County Commissioners
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Sincerely,

GOLDEN CITY COUNCIL

Jan Schenck, Mayor

Webb Aldrich

Chuck Baroch

Carol Johnson

Bill McKee

Ed Ramstetter

Brian Starling

RESOLUTION NO. 975

A RESOLUTION OF THE CITY OF GOLDEN CITY COUNCIL REQUESTING ADDITIONAL IMPARTIAL AND EXPERT EVALUATION OF THE PROPOSED HDTV TOWER ON LOOKOUT MOUNTAIN

WHEREAS, the City of Golden is home to the Colorado School of Mines, which is the oldest institution of higher education in the State of Colorado; and

WHEREAS, the Colorado School of Mines is world renowned for the quality of its teaching and research; and

WHEREAS, the members of the Colorado School of Mines faculty have expressed to City Council (see attached memorandum) their grave concerns over the potential negative technical impact of the proposed broadcast facilities on their research which brings over twenty million dollars into the local economy; and

WHEREAS, the Golden area is the location of more than a dozen high tech businesses that may also experience serious problems with the proposed tower; and

WHEREAS, many of those businesses may be forced to move out of the Golden area if the tower is constructed; and

WHEREAS, Colorado School of Mines faculty and Golden business owners have expressed to City Council that the tower proponents and the County have not adequately evaluated and addressed their concerns.

THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF GOLDEN, COLORADO:

Section 1. The Golden City Council respectfully requests that the Jefferson County Board of County Commissioners not approve any new broadcast towers on Lookout Mountain until competent studies of all potential interference is completed.

Section 2. Those studies should be conducted by an independent entity and in a manner acceptable to the faculty at the Colorado School of Mines.

Section 3. City Council further requests that the Commissioners give due consideration to the visual impacts the tower and associated buildings will have on the Golden community.

Adopted the 28th day of January, 1999.

Jan C. Schenck
Mayor

ATTEST:

Susan M. Brooks, CMC/AAE
City Clerk

APPROVED AS TO FORM:

James A. Windholz
City Attorney

I, Susan M. Brooks, City Clerk of the City of Golden, Colorado, do hereby certify that the foregoing is a true copy of a certain Resolution adopted by the City Council of the City of Golden, Colorado at a regular meeting thereof held on the 28th day of January, A.D., 1999.

(SEAL)

ATTEST:

Susan M. Brooks, City Clerk of the City of Golden, Colorado

opposition to the addition of this tower which will most certainly have a negative impact on all of our lives. To all the voices you have heard, I would like to add the voices of the approximately 400 residents of Riva Chase in a resounding "ditto" that you deny this request for this tower and rezoning requests. Thank you very much.

HOLLOWAY: Thank you. Okay, Morrison?

MOLA: Good evening. My name is Jake Mola. I live at 17991 West Alameda Parkway, Golden Colorado. I am here representing the Red Rocks Homeowners Association, which albeit compared to some of the other homeowners associations that you have heard is small. But we got together back in March concerning this tower issue and we decided as a group that we are also opposed to it for the reasons that you have been hearing and that we would appreciate it if you would deny this application. And I think that it's time to take a serious look at really what's going on in our home environment here, you know, concerning this and I think it is a big (inaudible) and I reiterate that when it is not absolutely known that things can be safe for the people that have young families and you know it just seems to me that you just can't play around with that. But, anyhow we respectfully, we'd like to ask that you deny this application. Thank you.

HOLLOWAY: Thank you. Okay. Golden?

STARLING: County Commissioners, I am Bryan Starling. I reside at 900 12th Street in Golden, Colorado. I am a City Councilor and I represent one among seven City Councilors that have sent you an encouraging letter to a for

Witness Testimony

Dr. Richard Hoffman

the people in the geophysics department, somebody in the university allowed, I believe it was Sprint, to build a cell telephone tower on the campus and that's the thing that's giving them the most trouble right now, the interference from...that they're getting in their equipment from this cellular telephone tower. So I would conclude at that point and just say that we are working with them and I think we're going to be able to work out our differences.

Okay. Thank you.

RAGONETTI: Madame Chair in the interest of time we conclude our presentation now. And we'd like to reserve time for rebuttal after public comment and presentation by others. And at that time we'll address the staff and Planning Commission conditions but Mr. Carl's description of our position on those conditions is substantially accurate. Thank you very much for your attention.

HOLLOWAY: We'll take...what? Alright. Let's take about a 15 minute break. When we get back we will hear from Dr. Hoffman. He will not be able to be here for the other hearings so we need to take the testimony and then we'll go on. So about 15 minutes. Where's Dr. Hoffman? Alright. Well he used to be right here. Okay. Tim, will you tell Dr. Hoffman he's next so that...

CARL: Yes. Dr. Hoffman?

HOLLOWAY: Thank you.

HOFFMAN: My name is Dr. Richard Hoffman. I've been the Chief Medical..

HOLLOWAY: Can I have you spell your last name and your address?

HOFFMAN: H-O-F-F-M-A-N. Address 4300 Cherry Creek Drive South, Denver Colorado 80246. I've been the Chief Medical Officer of the State Health Department since May 1998, State Epidemiologist since February 1987. I arrived in Colorado in July of '86. I have worked previously for five years for the Centers for Disease Control, three, the three prior to coming to Colorado were for the National Center for Environmental Health at CDC where my area of concentration was on health effects of exposure to dioxin. I'd like to make a few comments regarding this study that we conducted along with Jefferson County Health Department and with consultation from Dr. Reif at Colorado State University. The first I want to say is that I don't see things nearly as definitively or clearly as Dr. Cole and Dr. Bushberg stated in their presentations. Dr. Cole presented information about the limits of epidemiology. In my view epidemiology is most challenged when we're trying to understand long term health effects from low dose exposure. And in the studies that we've been talking about defining who is exposed and who is not exposed and what amount of exposure they've had over a course of many years has been not possible. And that causes major limitations in our ability to use epidemiologic data and draw definitive conclusions. There's been a lot of discussion earlier this evening about the standard, the safety standard, 200 microwatts per square centimeter. I've tried to and have my staff help me look at what is the basis for this standard. I can't say that I'm at the original documents for this but it appears to me that it is

based on acute health effects not based on long term risk of cancer. Generally when we deal with a standard for cancer protection it is expressed in terms such as we do not want an excess cancer risk of 1 in 10,000 or 1 in 100,000 over the course of a person's lifetime. We don't want to increase their risk by that much. And none of the material I saw was presented that would make me think that's the kind of standard that is being used. That kind of makes sense. I don't think the data are strong enough to set a number that would increase your cancer risk by 1 in 10,000 over the course of your lifetime. I don't think we have enough information to set that kind of standard yet. So as they say all that we can tell is that this 200 microwatts per square centimeter is a standard based on acute short term health effects. And there's a lot of difference in those kinds of standards. If you take two aspirin that would be safe. If you take 100 aspirin at one time you should be in the emergency department fighting for your life. If you take two aspirin every once in a while it won't cause any harm. If you take two aspirin every day for months and months and months and years it may cause bleeding in your stomach. So the degree of exposure and the length of exposure is very important in epidemiology in terms of drawing conclusions. Dr. Cole said that we in our study were doing a fishing expedition. I want to say that we used totally standard approach that's used throughout the country recommended by the Centers for Disease Control. We had to use our existing data which is the Central Colorado Cancer Registry. But the types of cancers that we selected to study in our first study from June of 1998 were based on published literature about potential associations of radio frequency exposure

with cancer. So it wasn't so mindlessly fishing. When we did our follow up study, the one that was released February 17th, 1999 it was based on information brought to us by members of the community and of course we serve the community and we looked into their concerns. We could not study every single type of cancer because this lock group analysis done in February of 1999 meant that we had to go back and essentially take the person who had cancer their street address and figure out which block group it is. And that was quite labor intensive so to do that for all types of cancer from the original study and still meet deadlines for trying to get a report out so that they could be considered by the County Commissioners was not possible. Nevertheless brain tumors were something that had been mentioned in the literature and so it seems totally appropriate to me that the one thing that we studied. I was the person who knowing that this was a controversial asked the CDC to review the report back in January. Met with them in Atlanta and that is why the letter is sent back to me but I think some of the sentences had been lifted out of context. It's been asserted that our study was not did not demonstrate a causal relationship. I just want to make it clear it didn't say that there was not an effect. It didn't say that there was an effect. It did not reach a conclusion but that is not the same as saying there's nothing there. It just did not reach a definitive conclusion. I happen to differ with Dr. McGeehan's sentence that's been extracted from the letter that says, "we are not convinced that there is in fact a cancer cluster in this population". It might be you can't take away the statistics. There is a statistically significant increase rate of malignant brain tumors in males in Block

Group 3. There is a statistically significant increase rate of benign tumors in females in Block Group 2. Those statistics will not go away. The issue is though can you combine Block Groups 2 and 3. Is it associated with radio frequency emissions from the towers? And the CDC letter talks about some of the problems or limitations in trying to draw that conclusion. We, in our report, also listed off those kinds of limitations. For example, we interviewed families in Block Group 3 where there were persons who had brain cancer and a number of them had worked in occupations such as an airplane pilot or weather radar or computer software which had been associated with an increased cancer risk. And the one possible idea of dealing with this interview data is to say you know what that explains it. That's entirely...the entire...and that explains why they got cancer. They worked as a pilot or electrician or radar. But another alternate explanation is that you take radio frequency emissions from the antennas plus their occupation and their risk was magnified greatly and that's why they developed cancer. My point is I don't know whether to discount it because of their occupations or that increased their risk when you add it in additional cancer potential promoter. So the study won't answer that. That's a limitation of the study but it also I just want to make the point you can't draw definitive conclusion about that one way or another. I heard Dr. Cole talk about multiple comparisons. That's where if you essentially if you do enough statistical tests you are going to find one that is statistically significant. Our report we were quite careful about that. We recognized that far in advance and in our report we counted up those tests and we did 24. I heard testimony that we did something

like 150. Our count was 24 tests were done. If it was all due to pure random chance at the usual scientific level, less than one would have been statistically significantly elevated but instead we found two that were and none that were not. I was interested in Dr. Cole's statistics because he was actually doing a lot of statistical tests that we had not done and one of them was the one you saw about that radio frequency emissions in other Block Groups besides 2 and 3 might actually lower your risk. I just want to say that's not one that the State Health Department and Jefferson County did. That was something that he must have done by examining the data himself prior to coming here. We made recommendations at the end of the report. Oh, one other point about the occupations, I think logically there's a problem in saying that there's no health effect, no cancer caused by radio frequency emissions. You know pretty much making a statement there's nothing causal there and then saying that people who were in certain occupations you have to discount them because those occupations which have electromagnetic frequency exposure, their cancer is caused by those occupational settings. You can't have it both ways. You can't say it's true occupationally but not true in a residential setting. So that's a concern of mine. Now at the end of our report we said that there were...we gave a number of recommendations, one of them was for more studies and potentially to look at other health outcomes. I just want to say from my experience with dioxin and I'm on the National Advisory Committee on childhood lead poisoning prevention, both of those, that you do need to look at other health outcomes. I heard Dr. Cole talk about that lead doesn't cause cancer. That's

true. I don't know the information that does. But it sure does a lot of other harmful effects and so we have to keep our minds open to all potential health effects. In the dioxin area we studied all sorts of problems with the immune system, the skin, the blood cells, etc. so we knew there was a problem with studying people over a long time to see if they develop cancer. They move in. They move out. It's hard to get a handle on the population but as a result we looked at shorter term things and it may be that we need studies of people who are exposed to radio frequency emissions to look at other health outcomes besides cancer. We also said in our report that there was no need for residents to move, to have catscans or MRI scans of their brain etc., but I heard you ask the question earlier would I live there. I just want to answer I don't know the risk myself. Would I live on Lookout Mountain? I don't know what the risk is. I can't quantify the risk exactly but it's our view in our agency that there is...there are some studies that have been published that indicate that there may be an association and it's on that basis that we have evolved to a position consistent with what Dr. Johnson put in his transmittal letter to you dated February 17th , in which he talked about trying to achieve as low as reasonably achievable exposure to radio frequency. And that would be our position as well, that you need to examine all the possible alternative sites and include in that what Lookout Mountain and I'm pleased to hear that that is being discussed this evening and try to make a decision based on a review of all the available options. And with that I will stop.

HOLLOWAY: Do you have any questions?

Richard E. Hoffman, MD, MPH

Dr. Hoffman has served as the State Epidemiologist for the Colorado Department of Public Health and Environment since February 1997. Beginning in May 1998 he assumed additional duties as the Chief Medical Officer for the Department. He currently directs programs concerning surveillance for AIDS and HIV, tuberculosis, vaccine-preventable diseases, viral hepatitis, nosocomial infections, general communciable diseases, childhood lead poisoning, hemophilia, and traumatic brain injuries. He received a Bachelor's degree in biology from Stanford University, an M.D. degree from the University of Texas Southwestern Medical School in Dallas, a Master of Public Health degree from the Johns Hopkins University School of Hygiene and Public Health and is board certified in General Preventive Medicine and was certified in Family Practice in 1982 and 1990.

Dr. Hoffman worked as a medical epidemiologist for the Centers for Disease Control and Prevention for five years (1978-1980 and 1983-1986), and during this tenure spent 3 years in Missouri conducting research on the health effects of soil contamination by dioxin. He is an Associate Professor in the Department of Preventive Medicine and Biometrics at the University of Colorado Health Sciences Center, a past-President of the Council of State and Territorial Epidemiologists, and a current member of the U.S. Department of Health and Human Services Advisory Committee on Childhood Lead Poisoning Prevention.

May 1999

Witness Testimony

Dr. John Witwer

KELLY: These are low doses.

HUTFLESS: These are low doses?

KELLY: High doses are what we use in radiation therapy to kill cancer cells in patients with cancer. Those are very, very high doses.

HUTFLESS: So the 1 to 20 would be a low dose?

KELLY: That's a low dose chronic exposure.

HUTFLESS: Alright. Thank you.

WITWER: Commissioners, I want to thank you very much for the opportunity to speak to you and give testimony this evening. My name is John Witwer. I am a physician. I live at 3111 Interlocken Drive in Evergreen Colorado and I have been on the staff at Lutheran Medical Center for 26 years and served as the Chairman of the Department of Radiology and also was on the Board of Directors as well as president of the medical staff. This evening I am speaking as a physician and as the state representative for the citizens of Lookout Mountain, Genesee and Golden. I had hoped that the study by Dr. Richard Hoffman of the Colorado Department of Public Health and Environment would settle an issue of great concern to the people of our community. And that basically, as you have heard tonight, is the health effects of the Lookout Mountain antenna complex a source of electromagnetic radiation whose power is planned to significantly increase in the near future. I've learned from the Department of Public Health and the Environment study and what I'm quoting here is from both the study as well as the summary that 1. "there is an established association in the scientific literature of brain tumor and occupational

exposure to electromagnetic radiation" and 2. "an association between residential radio frequency exposure and childhood leukemia". I've also learned from this study that there is "some evidence supported and some did not support an association between radio frequency exposure from the antennas with the occurrence of brain and central nervous system tumors". The issue of whether this particular source of radio frequency exposure is harming our community, the issue is unsettled and unsettling. My personal conclusions from this study are the following: I believe that there should be further investigation of alternative sites and that the antenna complex should be moved to a site or sites where the population will not be exposed to such intense radio frequency environment. 2. I would like to urge further scientific study of this issue because "(and this is from the summary of the Colorado Department of Public Health's study) "public health questions remain as to whether brain and central nervous system tumors could be associated with the radio frequency exposure from Lookout Mountain antenna farms". I would also like to point out during earlier testimony the two principles of epidemiology were touched on but I'd like to reiterate them and one is the co-factor concept and I will use the analogy with smoking and lung cancer. If you smoke for a long enough period of time and you'll get...have a chance of getting lung cancer perhaps 10 to 20%. However if you have the co-factor of either being exposed to asbestos or you work in a uranium mine the chances of getting a malignancy from smoking can approach 95%. So we have to consider and be concerned about the potential co-factors and I would like you to keep that in particular mind. Also, multipath reflections were also discussed. And it's

a very, very important that we get to the issue of the dose-response relationships. And this has been also touched upon. Not only is this a complex radio frequency environment it's a complex topological and geographic environment. So it is very, very difficult to make assessments without good, strong further study. Finally I would like to urge an environmental impact statement on the effects of electromagnetic radiation from the antenna complex on to the citizens of Golden, Lookout Mountain and Genesee. Finally for the same reasons I've outlined above I strongly urge the County Commissioners to not allow an overall cumulative increase in the electromagnetic environment on Lookout Mountain. Thank you very much.

HOLLOWAY: Any questions for John? Rick do you have for John?

SHEEHAN: What's the present status of the legislation's study passed in the house?

WITWER: It passed in the House.

SHEEHAN: What's the status?

WITWER: It's at the Senate committee tomorrow afternoon.

SHEEHAN: Do you have your 18 guaranteed votes?

WITWER: I had 36 in the House.

HOLLOWAY: Thank you.

DESTEFANO: Good evening, Commissioners. My name is Jon DeStefano. Should I spell that or? J-O-N-D-E-S-T-E-F-A-N-O. I'm president of the Jefferson County Board of Education.

2/17/99

I had hoped that this study would settle an issue of great concern to our community--the health effects of the Lookout Mountain Antenna complex, a source of electromagnetic radiation whose power is planned to double in the near future.

I have learned that there is "..an established association in the scientific literature of brain tumor and occupational exposure to electromagnetic radiation" and "an association between residential radiofrequency exposure and childhood leukemia". I have also learned from the present study that "some evidence supported and some did not support an association between radiofrequency exposure from the antennas with the occurrence of brain and central nervous system tumors".

The issue whether this particular source of radiofrequency exposure is harming our community is unsettled and unsettling.

The history of the press in the United States has a strong tradition of responsibility to the citizens of the community--a responsibility codified in the First Amendment to the Constitution. I would like to urge the Lake Cedar Group, the owners of the Lookout Mountain Antenna complex, to continue in this tradition of responsibility and good faith and work with the Jefferson County Commissioners and other elected officials to:

1) Investigate alternative sites and move the antenna complex to a site or sites where the population will not be exposed to such an intense radiofrequency environment,

2) Because "public health questions remain as to whether brain and central nervous system tumors could be associated with radiofrequency exposure from the Lookout Mountain antenna farms", urge further scientific study of this issue.

and 3) Urge an Environmental Impact Statement on the effects of electromagnetic radiation from the antenna complex on the citizens of Golden, Lookout Mountain, and Genesee.

John Witwer. M.D.

J.P. Witwer

H.D. 25, State Representative

Witness Testimony

Jon deStefano

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